

# Graduate Program Assessment Plan

## Program: Master of Science in Civil Engineering

Date: June 15, 2018 (revised)

### I. Performance Indicators or Assessments

The Civil Engineering Department offers a Master of Science (M.S.) degree in Civil Engineering designed to meet the educational needs of working professional engineers and traditional students. The areas of specialization within the program are environmental/water resources, geotechnical, structural, and transportation engineering. Students are required to choose one of these areas to specialize. In line with the Graduate School's goals of student learning, the Department's objectives for its graduates are as follows.

1. Demonstrate breadth and depth of knowledge and skills appropriate to the civil engineering specialization.
2. Communicate clearly and effectively through technical reports and oral presentations appropriate to the civil engineering specialization.
3. Apply appropriate concepts and methods to solve problems in a civil engineering specialization
4. Identify and analyze problems and issues appropriate to a civil engineering specialization.
5. Exhibit professional practices and ethics.

For the thesis option, students must complete 30 semester hours of course work, write a thesis, and present the research (CE 599). For the non-thesis option, students must complete 31 semester hours of course work, write a research paper, and present the research (CE 593). The candidate and the Advisory Committee must mutually agree upon the topic of the thesis or the research paper.

Table 1 summarizes four assessments (Graduate Faculty Evaluations of the students' rhetorical analysis (or other relevant assignment) paper in ENG 491 or an ENG 491 waiver essay; Graduate Advisory Committee Evaluations of the students' thesis/project and of the corresponding oral presentation; and an exit survey) conducted at two points within the program.

Table 1 – Civil Engineering Graduate Program Student Learning Outcomes and Assessments

<b>SIUE's Goals of Graduate Student Learning</b>	<b>Program Student Learning Outcomes</b>	<b>Performance Indicator or Measure</b>	<b>When the measure is assessed</b>	<b>Program Target</b>
Demonstrate Breadth and Depth of Knowledge in the Discipline	Demonstrate breadth and depth of knowledge and skills appropriate to a civil engineering specialization	(1) Faculty evaluation of the students' paper in ENG 491 (or waiver essay) (2) Faculty evaluation of a final research paper (CE 593) or a thesis (CE 599) (3) Faculty evaluation of a final presentation (4) Exit survey	(1) Completion of ENG 491 or approved waiver; and (2) (3) and (4) at the end of the program.	(1) 70% met or exceeded expectations; (2) and (3) 80% met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense; (4) 80% met or exceeded expectations.
Effectively Communicate Knowledge in the Discipline	Communicate clearly and effectively through technical reports and oral presentations appropriate to the civil engineering specialization	(1) Faculty evaluation of the students' paper in ENG 491 (or waiver essay) (2) Faculty evaluation of a final research paper (CE 593) or a thesis (CE 599) (3) Faculty evaluation of a final presentation (4) Exit survey	(1) Completion of ENG 491 or approved waiver; (2) (3) and (4) at the end of the program.	(1) 70% met or exceeded expectations (written communication only); (2) and (3) 80% met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense; (4) 80% met or exceeded expectations.
Demonstrate an Ability for Analytical Thinking in the Discipline	Identify and analyze problems and issues appropriate to a civil engineering specialization	(1) Faculty evaluation of the students' paper in ENG 491 (or waiver essay) (2) Faculty evaluation of a final research paper (CE 593) or a thesis (CE 599) (3) Faculty evaluation of a final presentation (4) Exit survey	(1) Completion of ENG 491 or approved waiver; (2) (3) and (4) at the end of the program.	(1) 70% met or exceeded expectations (identify a civil engineering problem only); (2) and (3) 80% met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense; (4) 80% met or exceeded expectations.
Exhibit the Best Practices, Values, and Ethics of the Profession	Exhibit professional practices and ethics	(1) Faculty evaluation of the students' paper in ENG 491 (or waiver essay) (2) Faculty evaluation of a final research paper (CE 593) or a thesis (CE 599) (3) Faculty evaluation of a final presentation (4) Exit survey	(1) Completion of ENG 491 or approved waiver; and (2) (3) and (4) at the end of the program.	(1) 70% met or exceeded expectations (cite sources properly); (2) and (3) 80% met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense; (4) 80% met or exceeded expectations.
Apply Knowledge of the Discipline	Apply appropriate concepts and methods to solve problems in a civil engineering specialization	(1) Faculty evaluation of a final research paper (CE 593) or a thesis (CE 599) (2) Faculty evaluation of a final presentation (3) Exit survey	(1) (2) and (3) at the end of the program.	(1) and (2) 80% met or exceeded expectations of the program through successful completion of the final project and a written report; and passing the final oral defense; (3) 80% met or exceeded expectations.

## II. Description of Program's Assessment Procedures and Process

### A. Describe measures of student learning goals

The assessment process of Civil Engineering (CE) graduate program consists of the following procedures:

- (1) Assessment Plan: graduate faculty to be familiar with approved graduate program assessment plan, goals and the method of assessment
- (2) Data collection: graduate faculty evaluate students' rhetorical analysis (or other relevant assignment) paper in ENG 491 or an ENG 491 waiver essay; graduate faculty evaluate students' thesis/research paper and their oral presentations; students evaluate the program using an exit survey.
- (3) Data analysis: Graduate Program Director analyzes data and reports to graduate faculty annually. Data includes (a) the graduate faculty's ratings on students' rhetorical analysis (or other relevant assignment) paper in ENG 491 or an ENG 491 waiver essay; (b) the graduate faculty's ratings on students' final research paper/thesis and oral presentation; (c) the students' exit survey ratings. The ratings of the current year will also be compared to those of the last three years.
- (4) Data review and action plan: analysis results are reported to graduate faculty and are discussed at an annual graduate assessment meeting, where an action plan will be developed for program improvement.
- (5) Documentation: assessment data and faculty review will be documented to produce the Annual Performance Report for reporting to the Graduate School and for department records.
- (6) Actions for program improvement: tasks are assigned to graduate faculty for implementing needed changes. Results of program improvement actions will be discussed at the annual meeting the following year.

Student learning outcomes are assessed at two different times/points in the program. At the early-point of the program, students complete the rhetorical analysis (or other relevant assignment) paper in ENG 491 or an ENG 491 waiver essay. Any students who intends to be exempt from the ENG 491 course requirement shall submit a personally-written, original essay for faculty evaluation within their first term of enrollment. If no waiver is granted, students need to take ENG 491, typically at least two semesters prior to their completion of the program. Upon completion of ENG 491, students are required to submit their ENG 491 paper, as submitted in ENG 491, to their graduate faculty advisor for assessment. The graduate faculty will evaluate the students' papers in ENG 491 (or an ENG 491 waiver essay) and rate students' performance on assessed outcomes by using the *CE ENG 491 Paper (or ENG 491 Waiver Essay) Assessment Form*. The levels of performance are described in the *CE ENG 491 Paper (or ENG 491 Waiver Essay) Assessment Rubrics* (see Appendices). The early point assessment focuses towards four of our five program objectives, as summarized in Table 2.

Students are also assessed at the end of the program (exit requirement), for both the final research paper (CE 593) or the thesis (CE 599) and the final presentation. Graduate faculty rate students' performance on assessed outcomes by using the *CE Final Project/Thesis Assessment form*, along with the *CE Final Project/Thesis Assessment*

*Rubrics* (see Appendices). The end point assessments focus towards our five program objectives, as shown in Table 2.

CE program objectives, aligned with the *Goals of Graduate Student Learning* (see Table 1) are outlined below:

- To demonstrate breadth and depth of knowledge and skills appropriate to a civil engineering specialization as measured by successful completion of a final project and report and a final presentation. Students are expected to demonstrate they possess the knowledge relevant to their research area and specialization through the use of quality literature in their final project and written report and their ability to respond to questions during the final presentation.
- To communicate clearly and effectively, as measured by successful completion or waiver of the technical writing requirement (ENG 491) and successful completion of a final project report and a final presentation. Students are expected to demonstrate acceptable writing style, organization, grammar and English usage in their reports; and thoroughness, cohesiveness, acceptable delivery style, and quality visual aids in their presentations.
- To identify and analyze problems and issues appropriate to a civil engineering specialization as measured by successful completion of a final project. Students are expected to clearly state objectives, discuss results, draw conclusions, and offer recommendations in their project reports.
- To exhibit professional practices and ethics in the final project and report. Students are expected to apply professional standards in conducting their final project and to abide by ethics as measured by the following performance indicators: to cite references and sources properly; to collect, report and analyze data including experiment data and/or computer data honestly and follow through on approved methodology; to acknowledge contributions of others appropriately; to seek review and obtain prior approval if the research involves in human subjects or the use of animals; to complete applicable university and department required training.
- To apply appropriate concepts and methods to solve problems in a civil engineering specialization as measured by successful completion of the final project. Students are expected to demonstrate appropriate data analysis or comparative study, experiment design or computer analysis in their final project.

The objectives adopted in the ENG 491 paper (i.e., rhetorical analysis or other relevant assignment paper) or waiver essay assessment and the final project/thesis assessment; and the questions used in the student exit survey are all aligned with the program learning outcomes, as can be seen in Table 2.

Table 2 – Civil Engineering Graduate Program Outcomes and Assessment Tools

<b>Program Student Learning Outcomes</b>	<b>Students' ENG 491 Paper or Waiver Essay Assessment</b>	<b>Final Project/Thesis Assessment</b>	<b>Student Exit Survey</b> (CE course content: taught by CE faculty or call staff)
Demonstrate breadth and depth of knowledge and	Demonstrate breadth of knowledge and skills appropriate to	Demonstrate breadth and depth of knowledge and	Q1: Provided adequate depth of knowledge

skills appropriate to the civil engineering specialization	specialization	skills appropriate to specialization	
Communicate clearly and effectively through technical reports and oral presentations appropriate to the civil engineering specialization	Demonstrate acceptable writing style, organization, grammar and English usage (written only)	Communicate clearly and effectively (written and verbal)	Q5: Emphasized clear communication (written and verbal)
Identify and analyze problems and issues appropriate to the civil engineering specialization	Identify problems and issues appropriate to the civil engineering specialization	Identify and analyze problems and issues	Q3: Built my critical thinking skills for drawing conclusions
Exhibit the Best Practices, Values, and Ethics of the Profession	Cite references properly	Exhibit professional practices and ethics	Q4: Enforced professional and ethical practices
Apply appropriate concepts and methods to solve problems in a civil engineering specialization	N/A	Apply appropriate concepts and methods to solve problems	Q2: Included appropriate concepts and relevant methods for problems solving

## B. Attach measures/rubrics

The CE graduate program assessment forms/rubrics are attached in the Appendices, which include the following:

- Civil Engineering ENG 491 Paper (or ENG 491 Waiver Essay) Assessment
- Civil Engineering Final Project/Thesis Assessment
- Civil Engineering Graduate Final Project/Thesis Assessment Cover Sheet
- Civil Engineering Final Project/Thesis Assessment – Rubrics
- Department of Civil Engineering Graduate Student Exit Survey

## C. Continuous quality improvement

The Graduate Program Director collects and analyzes the results from the early-point and end-point assessments (i.e., final project/thesis assessments and student exit survey) and reports to graduate faculty at the beginning of each fall semester. The following describes what is collected and analyzed.

- For the early-point assessment (i.e., ENG 491 rhetorical analysis (or other relevant assignment) paper or waiver essay assessment), the Graduate Faculty rate students' paper or waiver essay by using the *CE ENG 491 Paper (or ENG 491 Waiver Essay) Assessment form*, based on the *CE ENG 491 Paper (or ENG 491 Waiver Essay) Assessment Rubrics* (see Appendices). Our program target's is 70% "met or exceeded expectations" for the learning outcomes as indicated in the *CE ENG 491 Paper (or ENG 491 Waiver Essay) Assessment form*. To generate evidence-based program changes, the outcomes that have received a large number of "poor" ratings will be analyzed and discussed by graduate faculty in more detail to uncover the cause. Appropriate remediation actions will be developed and implemented by Graduate Faculty for program improvement.

- For the final project/thesis assessment, the Graduate Advisory Committee rates students' thesis/project and the corresponding oral presentation by using the *CE Final Project/Thesis Assessment form*, along with the *CE Final Project/Thesis Assessment Rubrics* (see Appendices). Our program target's is 80% "met or exceeded expectations" for each learning outcome. To generate evidence-based program changes, the outcomes that have received a large number of "poor" ratings will be analyzed and discussed by graduate faculty in more detail to uncover the cause. Appropriate remediation actions will be developed and implemented by Graduate Faculty for program improvement.
- At the time students defend their thesis/research paper, they are asked to complete an exit survey. The assessment of the student exit survey uses a scale of 1.0 to 5.0. Our program's target is 80% "met or exceeded expectations" for each survey question. The ratings of the current year will be compared to those of the past three years to monitor the trend for program improvement. The outcomes that have received a large number of low ratings will be analyzed and discussed by Graduate Faculty to uncover the cause. Appropriate remediation actions will be developed and implemented by graduate faculty for program improvement.

In addition, the early-point and end-point assessment results will be compared to find the difference for each outcome. Two comparisons will be made, as follows:

- ENG 491 paper (or waiver essay) assessment vs. final project/thesis assessment
- student exit survey (the part for CE course content) vs. final project/thesis assessment

The Graduate Program Director analyzes the differences and reports to the Civil Engineering Graduate Faculty at the beginning of each fall semester. The outcomes that have received a rating decrease from early-point to end-point assessments will be discussed to uncover the cause. The differences of the current year will also be compared to those of the past years to monitor the trends for program improvement. Appropriate remediation actions will be developed and implemented by the Graduate Faculty for program improvement.

**Appendices**

The materials start on the next page.

## Civil Engineering ENG 491 Paper (or ENG 491 Waiver Essay) Assessment

Student: \_\_\_\_\_

Paper Title: \_\_\_\_\_  
**ENG 491 Paper or ENG 491 Waiver Essay**

Faculty Evaluator: \_\_\_\_\_ Date: \_\_\_\_\_

<b>I. Measurement of Objectives</b>	<i>Student Performance</i>		
	<i>Exceeded Expectations</i>	<i>Met Expectations</i>	<i>Didn't Meet Expectations</i>
<b>Objective 1. Demonstrate breadth and depth of knowledge and skills appropriate to specialization</b>			
1a. Knowledge of relevant research on the subject	10 $\geq$ >8.5	8.5 $\geq$ $\geq$ 6	6 $>$ $\geq$ 0
1b. Extensiveness, quality and variety of literature	N/A	N/A	N/A
<b>Objective 2. Apply appropriate concepts and methods to solve problems</b>			
2a. Methodology (experiment design, computer analysis method, data collection)	N/A	N/A	N/A
2b. Data analysis and/or comparative study	N/A	N/A	N/A
<b>Objective 3. Identify and analyze problems and issues</b>			
3a. Statement of objectives	5 $\geq$ >4.5	4.5 $\geq$ $\geq$ 3	3 $>$ $\geq$ 0
3b. Discussions, conclusions, recommendations	N/A	N/A	N/A
<b>Objective 4. Exhibit professional practices and ethics</b>			
4a. Ethical research conducts (follow methodology in experiments, computer analysis, data collection)	N/A	N/A	N/A
4b. Citation of sources and use of references	10 $\geq$ >8.5	8.5 $\geq$ $\geq$ 6	6 $>$ $\geq$ 0
<b>Objective 5. Communicate clearly and effectively</b>			
<b>5a. Written Report</b>			
Writing style, organization, grammar, English usage	10 $\geq$ >8.5	8.5 $\geq$ $\geq$ 6	6 $>$ $\geq$ 0
<b>5b. Final Presentation</b>			
5b1. Thoroughness, cohesiveness, delivery style, and quality of visual aids	N/A	N/A	N/A
5b2. Ability to comprehend, respond to questions	N/A	N/A	N/A

## Civil Engineering Final Project/Thesis Assessment

Student: \_\_\_\_\_

Title and Date: \_\_\_\_\_

**Thesis** or **Research Paper**

Faculty Evaluator: \_\_\_\_\_

(Indicate if you are the Major Advisor/Committee Chair)

II. Measurement of Objectives	Student Performance					
	Exceeded Expectations		Met Expectations		Didn't Meet Expectations	
<b>Objective 1. Demonstrate breadth and depth of knowledge and skills appropriate to specialization</b>						
1a. Knowledge of relevant research on the subject	10 $\geq$	>8.5	8.5 $\geq$	$\geq$ 6	6 $>$	$\geq$ 0
1b. Extensiveness, quality and variety of literature	10 $\geq$	>8.5	8.5 $\geq$	$\geq$ 6	6 $>$	$\geq$ 0
<b>Objective 2. Apply appropriate concepts and methods to solve problems</b>						
2a. Methodology (experiment design, computer analysis method, data collection)	10 $\geq$	>8.5	8.5 $\geq$	$\geq$ 6	6 $>$	$\geq$ 0
2b. Data analysis and/or comparative study	10 $\geq$	>8.5	8.5 $\geq$	$\geq$ 6	6 $>$	$\geq$ 0
<b>Objective 3. Identify and analyze problems and issues</b>						
3a. Statement of objectives	5 $\geq$	>4.5	4.5 $\geq$	$\geq$ 3	3 $>$	$\geq$ 0
3b. Discussions, conclusions, recommendations	15 $\geq$	>12.5	12.5 $\geq$	$\geq$ 9	9 $>$	$\geq$ 0
<b>Objective 4. Exhibit professional practices and ethics</b>						
4a. Ethical research conducts (follow methodology in experiments, computer analysis, data collection)	10 $\geq$	>8.5	8.5 $\geq$	$\geq$ 6	6 $>$	$\geq$ 0
4b. Citation of sources and use of references	10 $\geq$	>8.5	8.5 $\geq$	$\geq$ 6	6 $>$	$\geq$ 0
<b>Objective 5. Communicate clearly and effectively</b>						
<b>5a. Written Report</b>						
Writing style, organization, grammar, English usage	10 $\geq$	>8.5	8.5 $\geq$	$\geq$ 6	6 $>$	$\geq$ 0
<b>5b. Final Presentation</b>						
5b1. Thoroughness, cohesiveness, delivery style, and quality of visual aids	5 $\geq$	>4.5	4.5 $\geq$	$\geq$ 3	3 $>$	$\geq$ 0
5b2. Ability to comprehend, respond to questions	5 $\geq$	>4.5	4.5 $\geq$	$\geq$ 3	3 $>$	$\geq$ 0
Available points in each category	100 $\geq$	>85.5	85.5 $\geq$	$\geq$ 60	60 $>$	$\geq$ 0
Student earned points in each category						
Total earned points from this evaluation report						

### Individual Report by Faculty Evaluator

**Final Report:** \_\_Acceptable \_\_Acceptable with revisions \_\_Unacceptable (< 54 points, Item 1-4, 5a)

**Final Presentation:** \_\_\_\_ Passed \_\_\_\_\_ Failed (< 6 points, Item 5b)

### Committee Chair Report on All Reports

2. Committee decision on student's work (total points from all reports divided by the number of reports):

Exceeded expectations > 85.5 points                      Met Expectations: 60-85.5 points

Didn't meet expectations < 60 points - which aspect failed? **Unacceptable Report (<54 points, Item 1-4, 5a)? Failed Presentation (<6 points, Item 5b)? Both Failed?**

3. Committee recommended actions on student work and/or graduate program improvements:

## Civil Engineering Graduate Final Project/Thesis Assessment Cover Sheet

Student: \_\_\_\_\_

Committee Chair: \_\_\_\_\_

For each objective, list the average numeric committee rating. Next, sum the overall recommendations for the final report and presentation. Attach this cover sheet to the individual committee member assessments and return the CE graduate program director.

<b>Measurement of Objectives</b>	<i>Student Performance</i>
	<i>Average Committee Rating (#.##)</i>
1a. Knowledge of relevant research on the subject	
1b. Extensiveness, quality and variety of literature	
2a. Methodology (experiment design, computer analysis method, data collection)	
2b. Data analysis and/or comparative study	
3a. Statement of objectives	
3b. Discussions, conclusions, recommendations	
4a. Ethical research conducts (follow methodology in experiments, computer analysis, data collection)	
4b. Citation of sources and use of references	
<b>5a. Written Report</b>	
Writing style, organization, grammar, English usage	
<b>5b. Final Presentation</b>	
5b1. Thoroughness, cohesiveness, delivery style, and quality of visual aids	
5b2. Ability to comprehend, respond to questions	
Average earned points	

### Recommendations by Faculty Evaluators

Report the total number of committee members recommending each of the following actions:

**Final Report:** \_\_\_\_\_ Acceptable \_\_\_\_\_ Acceptable with revisions \_\_\_\_\_ Unacceptable

**Final Presentation:** \_\_\_\_\_ Passed \_\_\_\_\_ Failed (< 6 points, Item 5b)

**Civil Engineering ENG 491 Paper (or ENG 491 Waiver Essay) Assessment - Rubrics**

Objective Measurement	Rating of Student Performance			
	<i>Exceeded Expectations</i>	<i>Met Expectations</i>		<i>Didn't Meet Expectations</i>
	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
<b>Objective 1. Demonstrate breadth and depth of knowledge and skills appropriate to specialization</b>				
1a. Knowledge of relevant research on the subject	Excellent and thorough understanding of relevant literature of analyzed subject.	Familiar with and adequate understanding of relevant literature, knowledgeable on analyzed subject.	Aware of relevant literature, some knowledge of analyzed subject.	Inadequate knowledge and misunderstanding of relevant literature, insufficient knowledge of analyzed subject.
1b. Extensiveness, quality and variety of literature	N/A	N/A	N/A	N/A
<b>Objective 2. Apply appropriate concepts and methods to solve problems</b>				
2a. Methodology (experiment design, computer analysis method, data collection)	N/A	N/A	N/A	N/A
2b. Data analysis and/or comparative study	N/A	N/A	N/A	N/A
<b>Objective 3. Identify and analyze problems and issues</b>				
3a. Statement of objectives, discussion of results	Analyzed problem is clearly defined and significance shown.	Analyzed problem is defined and significance indicated.	Analyzed problem is defined, but significance not shown.	Analyzed problem is not well defined and/or insignificant.
3b. Conclusions, recommendations	N/A	N/A	N/A	N/A
<b>Objective 4. Exhibit professional practices and ethics</b>				
4a. Ethical research conduct (follow methodology in experiments, computer analysis, data collection)	N/A	N/A	N/A	N/A
4b. Citation of sources and use of references	All references are cited properly. Contributions of others are fully acknowledged	References are cited. Contributions of others are acknowledged.	References are cited, some are missing. Acknowledgment is incomplete.	The citation of references and acknowledgment are incomplete or missing.
<b>Objective 5. Communicate clearly and effectively</b>				
<b>5a. Written Report</b>				
Writing style, organization, grammar, English usage	Excellent organization and structure of the paper. Excellent quality in text, figures, and English usage.	The presented paper is well organized. Text and figures are well prepared. No major errors of English usage.	The presented paper is organized. Improvements are needed on the structure, text, figures,	Lack of organization in the presented paper. Major Improvements are needed on text, figures, English usage.

Objective Measurement	<b>Rating of Student Performance</b>			
	<i>Exceeded Expectations</i>	<i>Met Expectations</i>		<i>Didn't Meet Expectations</i>
	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
			and English usage.	
<b>5b. Final Presentation</b>				
5b1. Thoroughness, cohesiveness, delivery style, quality of visual aids	N/A	N/A	N/A	N/A
5b2. Ability to comprehend and respond to questions	N/A	N/A	N/A	N/A

**Civil Engineering Final Project/Thesis Assessment - Rubrics**

Objective Measurement	Rating of Student Performance			
	<i>Exceeded Expectations</i>	<i>Met Expectations</i>		<i>Didn't Meet Expectations</i>
	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
<b>Objective 1. Demonstrate breadth and depth of knowledge and skills appropriate to specialization</b>				
1a. Knowledge of relevant research on the subject	Excellent and thorough understanding of relevant literature and research, in-depth knowledge of researched subject.	Familiar with and adequate understanding of relevant literature and research, knowledgeable on researched subject.	Aware of relevant literature and research, some knowledge of researched subject.	Inadequate knowledge and misunderstanding of relevant literature and research, insufficient knowledge of researched subject.
1b. Extensiveness, quality and variety of literature	Reviewed literature is comprehensive and extensive, covering both theory and application. Majority are peer-reviewed publications.	Reviewed literature covers a variety of sources including theory and application. A number of literatures are peer-reviewed publications.	Reviewed literature is from limited sources. Limited coverage on theory or application. Limited peer-reviewed publications.	Reviewed literature is inadequate and is not related well to the researched subject. Little peer-reviewed publications.
<b>Objective 2. Apply appropriate concepts and methods to solve problems</b>				
2a. Methodology (experiment design, computer analysis method, data collection)	Rigorous experiment design and/or computer analysis method appropriate to the researched subject. Justify selected methodologies and protocols. Explain assumptions and reasoning fully.	Experiment design and/or computer analysis method are appropriate to the researched subject. Describe assumptions and justify chosen methodologies and protocols.	Experiment design and/or computer analysis method is suitable to the researched subject, may not be the optimum choice. Some justification on the chosen methodologies and protocols.	Experiment design and/or computer analysis are not appropriate to the researched subject. Inadequate justification on the chosen methodologies and protocols.
2b. Data analysis and/or comparative study	Data are fully analyzed with appropriate concepts and methods. Appropriate comparisons with a wide variety of relevant solutions. Apply statistical and/or sensitivity analysis, where applicable.	Data are analyzed using appropriate concepts and methods. Some comparisons with a few relevant solutions. Consider statistical and/or sensitivity analysis, where applicable.	The concepts and methods for data analysis are mostly appropriate, but correction is needed on some analysis. Limited comparisons with other relevant solutions.	Major problem with concepts and methods of data analysis. Little or no comparison with other relevant solutions.
<b>Objective 3. Identify and analyze problems and issues</b>				

Objective Measurement	Rating of Student Performance			
	<i>Exceeded Expectations</i>	<i>Met Expectations</i>		<i>Didn't Meet Expectations</i>
	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
3a. Statement of objectives, discussion of results	Research problem is clearly defined and significance shown. Results are evaluated correctly. Major alternatives are assessed thoughtfully. Result discussions are linked to research objectives and are related to other relevant work.	Research problem is defined and significance indicated. Results are evaluated and are mostly correct. There is assessment on alternatives. Result discussions are linked to research objectives, related to some other relevant work.	Research problem is defined, but significance not shown. Results are evaluated, but have some problem. Little assessment on alternatives. Show some linkage of result discussions to research objectives.	Research problem is not well defined and/or insignificant. Results are evaluated, but have some major problems. Little or no assessment on alternatives. No linkage of results to research objectives.
3b. Conclusions, recommendations	Conclusions are clearly drawn from results. Future research is recommended. New research questions are suggested.	Conclusions are drawn from results. Some but brief recommendations on future research and new research questions.	Conclusions are drawn from results, but the linkage is vague. Limited recommendations on future and new research questions.	Weak or inappropriate connection between conclusions and results. No recommendations on future and new research questions.
<b>Objective 4. Exhibit professional practices and ethics</b>				
4a. Ethical research conduct (follow methodology in experiments, computer analysis, data collection)	Follow through diligently and honestly on approved methodology in conducting experiments, computer analysis, data collection, and reporting.	Follow through on the majority of approved methodology in conducting experiments, computer analysis, data collection, and reporting.	Follow through on some portion of approved methodology in conducting experiments, computer analysis, data collection, and reporting.	Not follow through on approved methodology in conducting experiments, computer analysis, data collection, and reporting.
4b. Citation of sources and use of references	All references are cited properly. Contributions of others are fully acknowledged	References are cited. Contributions of others are acknowledged.	References are cited, some are missing. Acknowledgment is incomplete.	The citation of references and acknowledgment are incomplete or missing.
<b>Objective 5. Communicate clearly and effectively</b>				
<b>5a. Written Report</b>				
Writing style, organization, grammar, English usage	Excellent organization, structure, presentation of the research. Excellent quality in text, figures, and English usage.	The presented research is well organized. Text and figures are well prepared. No major errors of English usage.	The presented research is organized. Improvements are needed on the structure, text, figures, and English usage.	Lack of organization in the presented research. Major Improvements are needed on text, figures, English usage.
<b>5b. Final Presentation</b>				
5b1. Thoroughness, cohesiveness, delivery style, quality of visual aids	Very thorough and cohesive oral presentation. The presentation is of excellent quality and well prepared.	The oral presentation covers major aspects of the research. The presentation is of good quality and well	The oral presentation covers most of the research, some aspects are missing. The presentation is of acceptable	The oral presentation misses some important aspects of the research. Major improvement is needed with the

<b>Objective Measurement</b>	<b>Rating of Student Performance</b>			
	<i>Exceeded Expectations</i>	<i>Met Expectations</i>		<i>Didn't Meet Expectations</i>
	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
		prepared.	quality, but can be improved.	presentation.
5b2. Ability to comprehend and respond to questions	Fully comprehend questions. Answer all questions correctly with explanations and elaborations.	Comprehend and answer majority of questions correctly. Need guidance with some questions.	Able to comprehend and answer questions. Unable to handle some answers. Some answers are incorrect.	Unable to comprehend or answer most questions.

**Department of Civil Engineering Graduate Student Exit Survey**

As part of the Department’s assessment process, we would like your feedback regarding the M.S. program in Civil Engineering. We will use the results to improve the program. Please complete the following survey anonymously and return it to the Graduate Program Director. Thank you for your assistance.

Indicate your specialization:                      Environmental/Water Resource                      Structural                      Transportation                      Geotechnical

Circle your responses.

M.S. Program Component	Rating					
Initial advisement by the Graduate Program Director	Poor (1)	Deficient (2)	Satisfactory (3)	Good (4)	Excellent (5)	
Advisement by your major advisor	Poor (1)	Deficient (2)	Satisfactory (3)	Good (4)	Excellent (5)	
Communication from the Department	Poor (1)	Deficient (2)	Satisfactory (3)	Good (4)	Excellent (5)	
Course scheduling	Poor (1)	Deficient (2)	Satisfactory (3)	Good (4)	Excellent (5)	
CE course content: (taught by CE faculty or call staff)						
Q1: Provided adequate depth of knowledge	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	
Q2: Included appropriate concepts and relevant methods for problems solving	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	
Q3: Built my critical thinking skills for drawing conclusions	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	
Q4: Enforced professional and ethical practices	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	
Q5: Emphasized clear communication (written and verbal)	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	

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Non-CE course content: * (taught by other departments)						
Gave adequate breadth of knowledge	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	Not applicable
Provided relevant content	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	Not applicable
Enforced professional and ethical practices	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	Not applicable
Emphasized clear communication (written and verbal)	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	Not applicable

\* Examples of non-CE courses for the purposes of this survey include ME 470, and ENG 491.

**Please provide comments regarding your ratings or other aspects of the program or Department. Identify particular courses that you feel strongly about, either positively or negatively. Use the back if you need more space.**